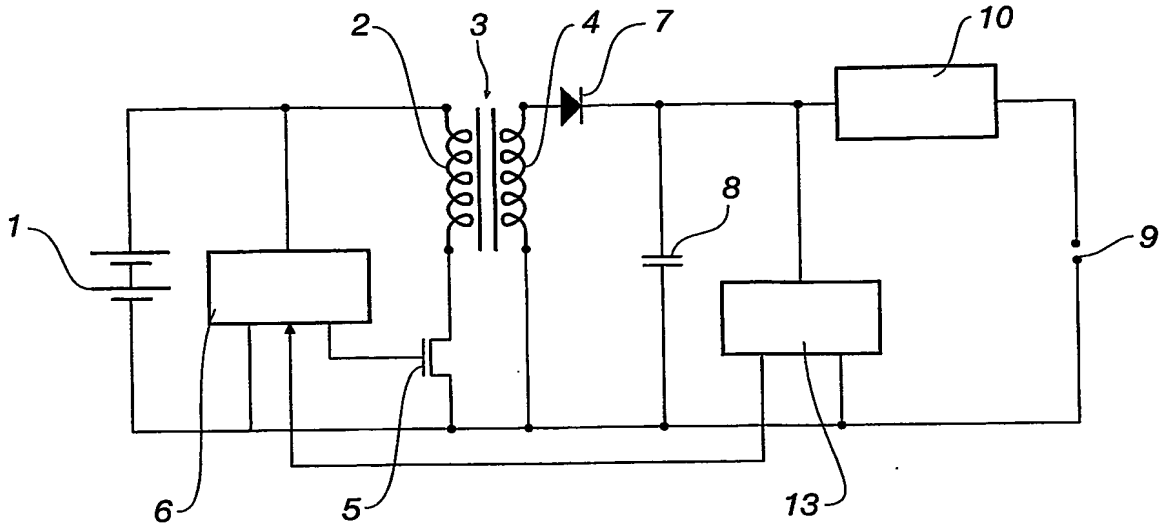

Fig 1
(Prior Art)

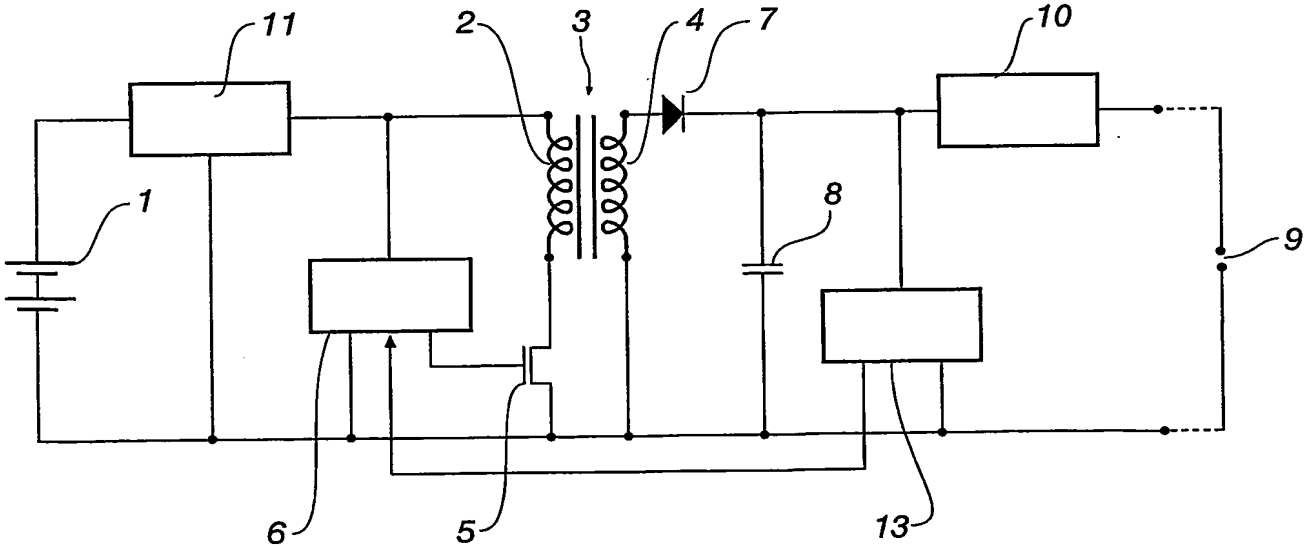

Fig 2
(Prior Art)

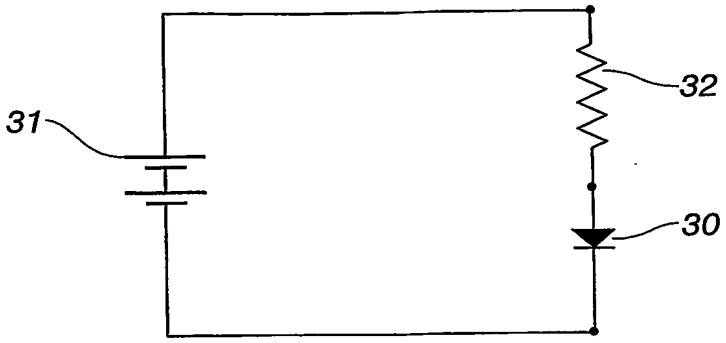

Fig 3
(Prior Art)

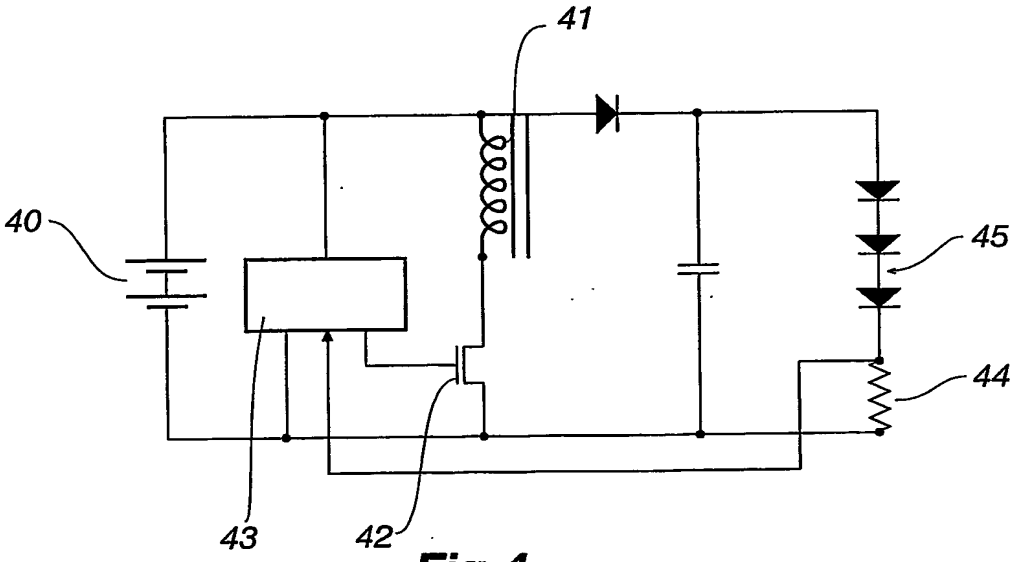

Fig 4
(Prior Art)

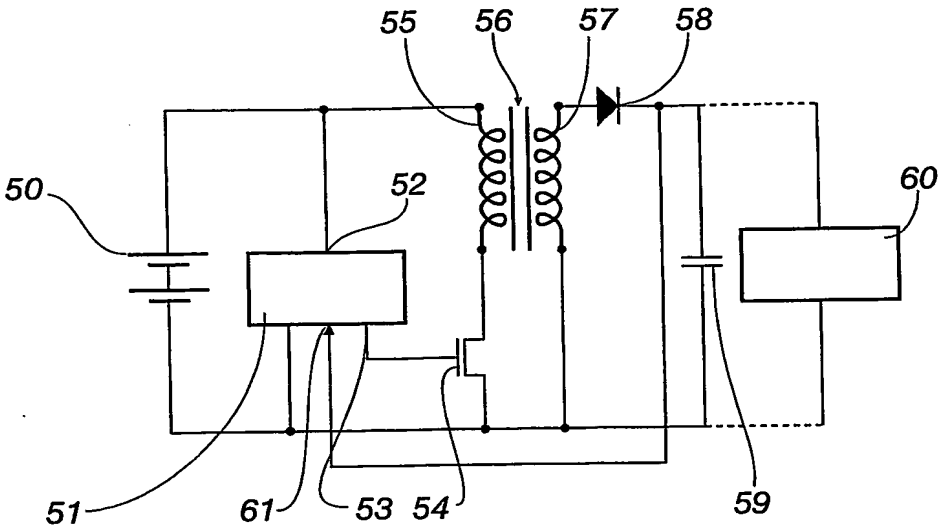

Fig 5

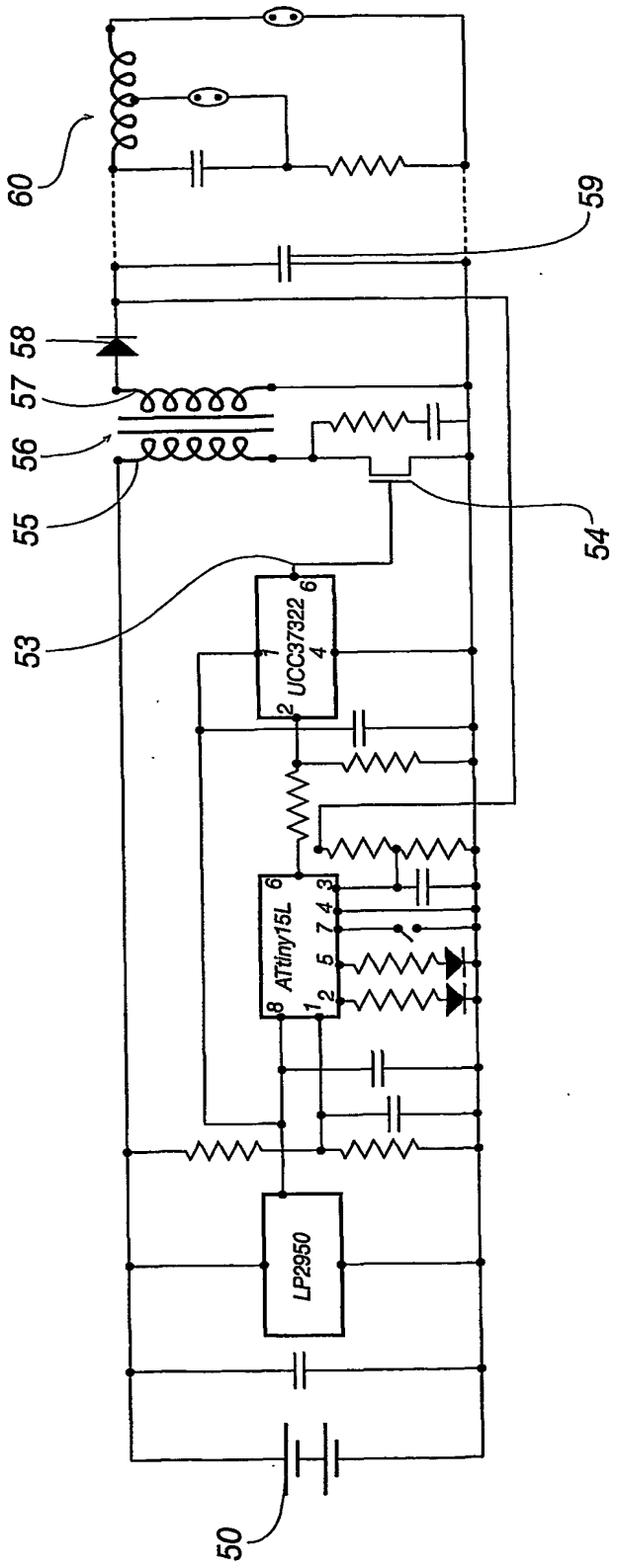

Fig 6

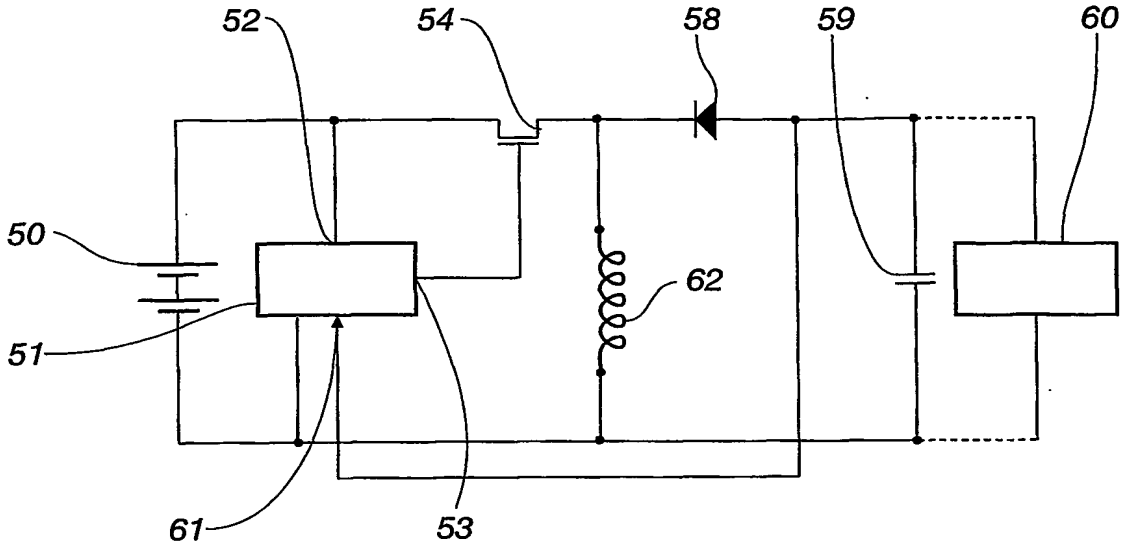

Fig 7

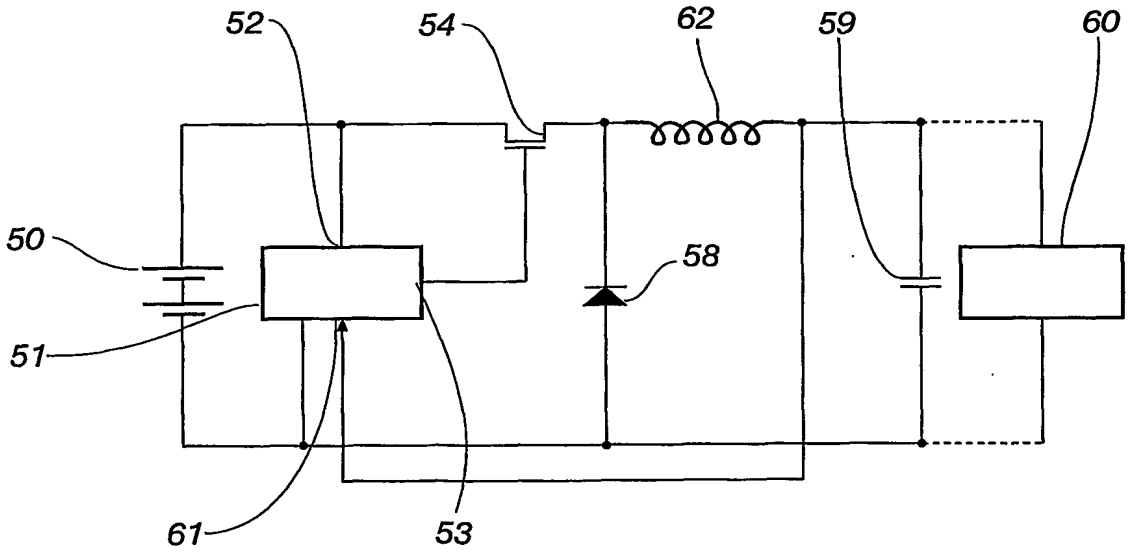

Fig 8

```
RJMP    +0x0118
RJMP    +0x0100
NOP
NOP
NOP
RJMP    +0x0101
NOP
NOP
RJMP    +0x0160

; look-up table inserted here

; Look-up routine
SUBI    R17,0x6C
SBCI    R18,0x01
BRCS    +0x0E
BST     R29,5
BRTS    +0x03
LDI     R30,0x12
LDI     R31,0x00
RJMP    +0x0005
SUBI    R18,0x01
LSR     R18
ROR     R17
LDI     R30,0x12
LDI     R31,0x01
ADD     R30,R17
ADC     R31,R18

; Fetch duty cycle from table
LPM
RET
CLR     R0
RET
RJMP    +0x0019
IN      R5,0x3F
CLR     R6
OUT     0x3B,R6
OUT     0x3F,R5
RETI

IN      R5,0x3F
INC     R23
DEC     R19
DEC     R22
IN      R9,0x16
BST     R9,2
```

Fig 9

```
SBRC    R16,0
CLR     R29
LDI     R16,0x30
OUT     0x35,R16
LDI     R16,0x13
OUT     0x17,R16
SBI     0x18,2
SBI     0x18,4
LDI     R16,0x10
OUT     0x21,R16
LDI     R16,0x00
OUT     0x21,R16
LDI     R30,0xFF
LDI     R31;0x03
LPM
OUT     0x31,R0
CLR     R0
LDI     R16,0x8B
OUT     0x6,R16
LDI     R16,0x61
OUT     0x30,R16
LDI     R16,0xFF
OUT     0x2D,R16
LDI     R16,0x04
OUT     0x33,R16
LDI     R16,0x02
OUT     0x39,R16
LDI     R16,0x60
OUT     0x3A,R16
CLR     R16
OUT     0x34,R16
RET
```

Fig 9

```
BRTC    +0x07
ORI     R29,0x08
MOV     R16,R0
LSR     R16
LSR     R16
SUB     R0,R16
MOV     R7,R0
CLR     R10
ANDI    R17,0xC0
ADD     R17,R17
ADC     R18,R18
ADC     R17,R17
ADC     R18,R18
ADC     R17,R17
MOV     R16,R18
MOV     R18,R17
MOV     R17,R16
RCALL   -0x00BE
BST     R29,3
BRTS    +0x02
BST     R29,2
BRTC    +0x07
MOV     R16,R0
LSR     R16
LSR     R16
SUB     R0,R16
CP      R7,R0
BRCS    +0x01
MOV     R7,R0
CP      R20,R0
BREQ    +0x02
BRCS    +0x04
BRCC    +0x07
SBRC    R29,3
MOV     R20,R7
RJMP    +0x0005
INC     R20
SBRC    R29,3
MOV     R20,R7
RJMP    +0x0001
MOV     R20,R0
OUT     0x2E,R20
CLR     R17
CLR     R18
CLR     R4
CLR     R28
RJMP    -0x00C4
IN      R16,0x34
```

Fig 9

```
SBIS    0x7,1
RJMP    -0x000B
IN      R26,0x4
IN      R27,0x5
CBI     0x7,1
SBI     0x6,6
ADD     R4,R26
ADC     R28,R27
INC     R3
SBRS    R3,6
RJMP    -0x0070
CLR     R3
BST     R29,0
BRTS    +0x03
CLR     R18
CLR     R17
RJMP    +0x0049
MOV     R8,R18
ANDI    R29,0xBF
CPI     R28,0x46
BRCS    +0x03
ORI     R29,0x40
SBRS    R29,1
RJMP    -0x0067
CPI     R18,0xFF
BRCC    -0x1C
CPI     R18,0x9B
BRCS    +0x02
ORI     R29,0x20
RJMP    +0x0005
ANDI    R29,0xDF
CPI     R18,0x64
BRCS    +0x02
ORI     R29,0x10
RJMP    -0x0072
BST     R29,1
BRTS    +0x13
MOV     R24,R18
SUBI    R24,0x64
ADD     R24,R24
ADD     R24,R24
LSR     R24
BST     R29,3
BRTS    +0x0C
CPI     R18,0x78
BRCC    +0x09
INC     R10
BST     R10,7
```

Fig 9

```
BRNE    -0x05
ANDI    R29,0xFD
RJMP    -0x0007
SBRS    R29,0
RJMP    +0x0007
SBRC    R29,6
RJMP    +0x0011
SBRC    R29,3
RJMP    +0x0012
SBRC    R29,2
RJMP    +0x0016
RJMP    +0x0003
SBI     0x18,4
CBI     0x18,0
RET
SBI     0x18,0
CBI     0x18,4
RET
SBI     0x18,0
SBI     0x18,4
RET
CBI     0x18,0
CBI     0x18,4
RET
SBRS    R23,0
RJMP    -0x000B
RJMP    -0x0006
ANDI    R23,0x1F
CPI     R23,0x1E
BRCC    -0x0C
CP      R23,R24
BRCC    -0x0E
RJMP    -0x0012
SBRS    R23,4
RJMP    -0x0014
RJMP    -0x000F

; Read in battery voltage from ADC
IN      R26,0x4
IN      R27,0x5

SBI     0x7,1
SBI     0x6,6
ADD     R17,R26
ADC     R18,R27
RJMP    -0x0063
RJMP    -0x004E
IN      R5,0x3F
```

Fig 9

```
BRTC    +0x09
CPI     R21,0x31
BRCC    +0x02
ORI     R29,0x04
RJMP    +0x0004
CPI     R21,0x45
BRCC    +0x02
ANDI    R29,0xFB
RJMP    +0x0000
LDI     R21,0x49
DEC     R21
RJMP    -0x0014
CLI
RCALL   +0x00AE
ANDI    R29,0x10
CLR     R20
OUT     0x2E,R20
SBI     0x18,4
CBI     0x18,0
SEI
LDI     R19,0x48
AND     R19,R19
BRNE    -0x02
CLI
LDI     R16,0x40
OUT     0x3B,R16
CBI     0x18,4
SEI
SLEEP
CLI
BST     R29,4
BRTS    -0x12
LDI     R29,0x03
CLR     R3
CLR     R17
CLR     R18
CLR     R4
CLR     R28
SEI
LDI     R16,0x80
OUT     0x7,R16
SBI     0x6,6
LDI     R22,0x78
LDI     R21,0x48
RCALL   +0x0006
AND     R21,R21
BREQ    -0x21
AND     R22,R22
```

Fig 9